

# Solid State Logic

SOUND || VISION



## Super-Analogue™ Outboard X-Rack Mic Amp User's Guide

This documentation package contains the User's Guide for your new X-Rack Mic Amp module. Depending on the age of your X-Rack, these pages may already be present in your X-Rack Owner's Manual – please check to see if these pages match your Manual. If they do not, these pages should be filed alongside it.

*Please Note.* X-Rack units prior to serial number XRK0110 are not 100% compatible with the X-Rack Mic Amp as these units can not provide +48V phantom power unless field retrofit kit 629620XR has been fitted. This kit is available free-of-charge from your local distributor, if the X-Rack unit concerned is in warranty. For units that are out of warranty a small charge will be made. The absence of this kit is indicated by the buscard in the X-Rack being a '629620X1 RE 1' (rev 1), with a number of components (ie. 'IC2', 'C4', 'L4') missing.

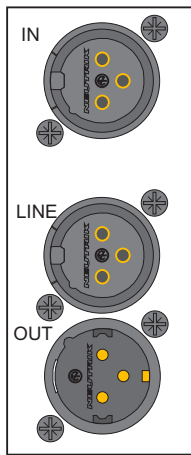
For correct operation of Total Recall™, your X-Rack unit must be running V1.1/0 or later software. Please refer to your X-Rack Owners Manual for instructions on how to check the current software version and how to obtain and install a newer version if required.

There may be a newer version of the X-Rack Owner's Manual available for download from our website ( <http://www.solid-state-logic.com> )



## A. The Mic Amp Module

### A.1 Connection



The rear panel of the module carries the Mic ('IN') and Line input ('LINE') XLRs along with a single output ('OUT') XLR. The Line input and output operate at a nominal level of +4dBu although the gain of the Line input can be varied by a front panel control. Also contained on the front panel is an additional mono Jack socket for a high impedance Instrument input.

### A.2 Operation

The X-Rack Mic module contains three separate input amplifiers; a Microphone amplifier, an Instrument input and a Line input, any one of which may be selected at any one time. A set of High and Low Pass filters are also provided.

#### A.2.1 MIC Section 1

Normally, the Microphone input on the rear of the module will be selected ('LINE' and 'INST' switches released); pressing the 'INST' switch selects the mono jack instrument input on the front of the module. This is a very high impedance unbalanced input intended to be used with guitar pickups etc. To help alleviate 'hum', a ground lift ('GND LFT') switch has been provided which places a 1k $\Omega$  impedance in series with the sleeve of this connector and audio ground in the module. The gain of these inputs is continuously variable between +12dB and +75dB.

The impedance of the Microphone input can be varied between  $\approx 1\text{k}\Omega$  and  $\approx 10\text{k}\Omega$  by selecting the 'IMP IN' switch and adjusting the 'Z' control. This allows the connection of line level signals to the Microphone input if required, and provides an alternative input impedance for some dynamic microphones.

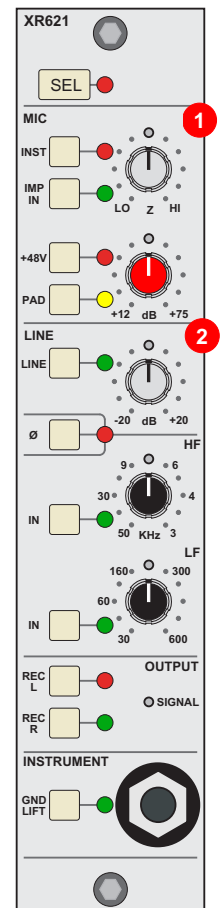
The 'PAD' switch reduces the signal level of both the Microphone or Instrument inputs by 20dB. Phantom power, for microphones requiring this, can be switched on using the '+48V' switch. *Please note that X-Rack units prior to serial number XRK0110 are **not** normally enabled for +48V. However, a field retrofit kit (629620XR) is available for these units. Any in-warranty X-Rack units can be upgraded free-of-charge; for units out of warranty a charge will be made. Please contact your local distributor to order this kit, if required.*

*Note. Please note that connecting a microphone to the X-Rack Mic module with phantom power switched on is not advised as it may cause damage to either the microphone or the input stage of the X-Rack module. Take care not to connect line level sources (keyboards etc.) to the microphone input with phantom power switched on as this may damage the output stage of the connected unit.*

#### A.2.2 LINE Section 2

The Line input on the rear of the module is selected by pressing the 'LINE' switch. The gain of this input can be varied by  $\pm 20\text{dB}$  from the nominal 0dB.

The  $\emptyset$  (Phase) switch reverses the phase of the selected input.



**A.2.3 HF/LF Section 3**

This section contains simple high and low pass filters as follows:

- HF (Low Pass): Frequency range 50kHz – 3kHz (-3dB point)  
Slope: 12dB/Octave
- LF (High Pass): Frequency range 30Hz – 600Hz (-3dB point)  
Slope: 18dB/Octave

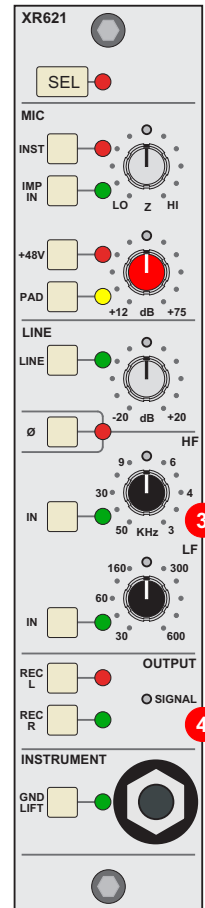
The two filters can be switched into circuit independently.

**A.2.4 OUTPUT Section 4**

This small section contains a tri-colour signal present indicator and two routing switches ('REC L' and 'REC R') which route the module signal onto a common internal record bus.

The signal present indicator measures signals immediately prior to the output amplifier. It will light GREEN for output signals above the lower threshold of -60dBu, AMBER for signals between +4dBu and +24dBu and lights RED for signals above +24dBu.

The record bus is not currently used but may be used by forthcoming X-Rack modules (such as the XR622 Mix/Monitor Module, due late 2006).



### A.3 Performance Specification

The following pages contain audio performance specification figures for the X-Rack Mic Amp module. No other Solid State Logic products are covered by this document and the performance of other Solid State Logic products can not be inferred from the data contained herein.

#### A.3.1 Measurement Conditions

For each set of figures on the following pages, the specific unit and test setup will be stated at the beginning of that section. Any changes to the specified setup for any particular figure(s) will be detailed beside the figures to which that difference applies.

#### A.3.2 Measurement References

Unless otherwise specified the references used in this specification are as follows:

- Reference frequency: 1kHz
- Reference level: 0dBu, where 0dBu  $\approx$  0.775V into any load
- Source impedance of Test Set: 50 $\Omega$
- Input impedance of Test Set: 100k $\Omega$
- All unweighted measurements are specified as 22Hz to 22kHz band limited RMS and are expressed in units of dBu
- All distortion measurements are specified with a 36dB/Octave low pass filter at 80kHz and are expressed as a percentage
- The onset of clipping (for headroom measurements) should be taken as 1% THD
- Unless otherwise quoted all figures have a tolerance of  $\pm$ 0.5dB or 5%
- All measurements are made with the operating level switch set for +4dBu

#### A.3.3 Microphone Amplifier Performance

Signal applied to Microphone Input and measured at Output. Pad switched out and Input Gain control set to +12dB (minimum).

Gain	Continuously variable from +12dB to +75dB Independently switchable 20dB Pad available
Input Impedance	Continuously variable from $\approx$ 1k2 $\Omega$ to $\approx$ 10k $\Omega$
Output Headroom	> +26dBu at onset of clipping
THD + Noise (-18dBu applied, +28dB gain)	< 0.003% at 1kHz < 0.006% at 10kHz
Frequency Response	+0.05dB/-0.1dB from 20Hz to 20kHz -3dB at 150kHz
Equivalent Input Noise (input terminated with 150 $\Omega$ )	< -127dB at maximum gain < -90dB at 0dB gain (+20dB with Pad 'IN')
Common Mode Rejection (-10dBu applied, +30dB gain)	> 75dB from 50Hz to 1kHz > 70dB at 10kHz

**A.2.4 Instrument Input Performance**

Un-balanced signal applied to Instrument Input and measured at Output. Pad switched out and Input Gain control set to +12dB (minimum).

Gain	Continuously variable from +12dB to +75dB Independently switchable 18dB Pad available
Input Impedance	1M $\Omega$
Output Headroom	> +26dBu at onset of clipping
THD + Noise (-18dBu applied, +28dB gain)	< 0.03% at 1kHz < 0.05% at 10kHz
Frequency Response	+0.05dB/-0.1dB from 20Hz to 20kHz -3dB at 150kHz
Equivalent Input Noise (Input terminated with 150 $\Omega$ )	< -82dB at +12dB (minimum) gain < -88dB at +28dB gain (mid' position)

**A.2.5 Line Input Performance**

Signal applied to Line Input and measured at Output. Input Gain control set to 0dB (indent).

Gain	Continuously variable from -20dB to +20dB
Input Impedance	> 10k $\Omega$
THD + Noise (+24dBu applied, 0dB gain)	< 0.005% from 20Hz to 20kHz
Frequency Response	$\pm$ 0.1dB from 20Hz to 20kHz -3dB at 150kHz
Equivalent Input Noise (Input terminated with 150 $\Omega$ )	< -90dB

## A.4 Calibration Information

The X-Rack Mic Amp module is factory calibrated and should only need calibration if a potentiometer or other component has been replaced or if it is suspected that there is a problem with calibration.

In each of the following instructions it is assumed that the lid of the X-Rack has been removed and that power has been applied. It is also assumed that unless otherwise specified, all switches are released and all front panel potentiometers are at unity or minimum position as appropriate. The required accuracy for each adjustment will be specified along with the target value. All level and distortion measurements should be made with audio-band 20Hz to 20kHz filters unless otherwise specified.

All presets are accessible from the top of the unit.

### A.4.1 Microphone Input

Equipment Required:	Calibrated audio oscillator and audio level meter
Test Signal:	50Hz sinewave @ -12dBu, common mode
Input and Output:	Oscillator to Mic Input and Output to the audio level meter
Unit Setup:	Set the Mic Gain to '36dB' (mid-position)
<b>CMRR Trim</b>	
Adjustment:	Adjust VR7 (CMRR) for minimum level (normally < -40dBu)

### A.4.2 Line Input

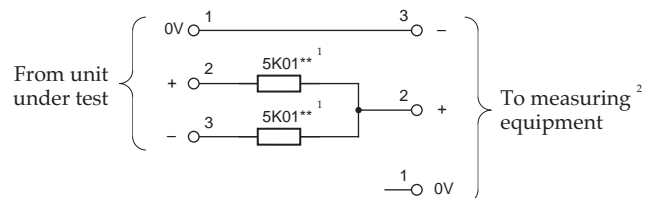
Equipment Required:	Calibrated audio oscillator and audio level meter
Test Signal:	1kHz sinewave @ 0dBu
Input and Output:	Oscillator to Line Input and Output to the audio level meter
Unit Setup:	Set the Line Gain to indent (0dB) and select 'LINE'
<b>Level Trim</b>	
Adjustment:	1. Adjust VR6 (0dB) for 0dBu ±0.05dB.

### A.4.3 Output Balance

Equipment Required:	Calibrated audio oscillator, audio level meter and a 'balance' adaptor (see below)
Test Signal:	1kHz sine wave at +24dBu
Input and Output:	Oscillator to Line Input and Output to the audio level meter via the 'balance' adaptor
Unit Setup:	Set the Line Gain to indent (0dB) and select 'LINE'
Adjustment:	Adjust VR8 (BAL) for minimum level (< 55dBr)

### A.4.4 'Balance' Adaptor

For the output balance adjustment, a 'balance' adaptor such as that illustrated here will be required. This adaptor consists of a pair of close tolerance resistors in an in-line cable and is used to sum together a balanced output in order to correctly adjust the level balance of the measured output; perfect balance should result in complete signal cancellation.



- Note 1. Resistor tolerance should ideally be 0.01%  
 2. Absolute level measured will depend upon the input impedance of the measuring equipment.

### A.5 Connector Details

Audio Input	
Location: Rear Panel	
Conn' Type: XLR Female	
Pin	Description
1	Chassis
2	Audio +ve
3	Audio -ve

Audio Output	
Location: Rear Panel	
Conn' Type: XLR Male	
Pin	Description
1	Chassis
2	Audio +ve
3	Audio -ve

Instrument Input	
Location: Front Panel	
Conn' Type: Mono 1/4" Jack Socket	
Pin	Description
Tip	Guitar Input
Sleeve	Chassis

### A.6 Physical Specification \*

Depth: 200mm / 7.9 inches  
 275mm / 10.9 inches

Height: 171mm / 6.75 inches

Width: 35mm / 1.4 inches  
 49mm / 1.9 inches

Weight: 260g / 9.5 ounces

Boxed size: 190mm x 290mm x 70mm / 7.5" x 11.5" x 2.5"

Boxed weight: 460g / 16.5 ounces

*including front panel knobs, excluding connectors  
 including front panel knobs and connectors*

*front/rear panels  
 overall width (front and rear panels are offset)*

\* All values are approximate

### A.7 Environmental Specification

As per X-Rack – see page 17.